



# LTUG

## Short introduction of JSC at FZJ

# Forschungszentrum Jülich GmbH (FZJ)

One of the largest research centres in Europe

## Jülich Supercomputing Centre (JSC)

Operates the central supercomputers, servers and  
campus-wide computer networks

**Field:** High Performance Computing

### **Members/Focus:**

Stephan Graf – Open Systems

Ulrike Schmidt - Open Systems

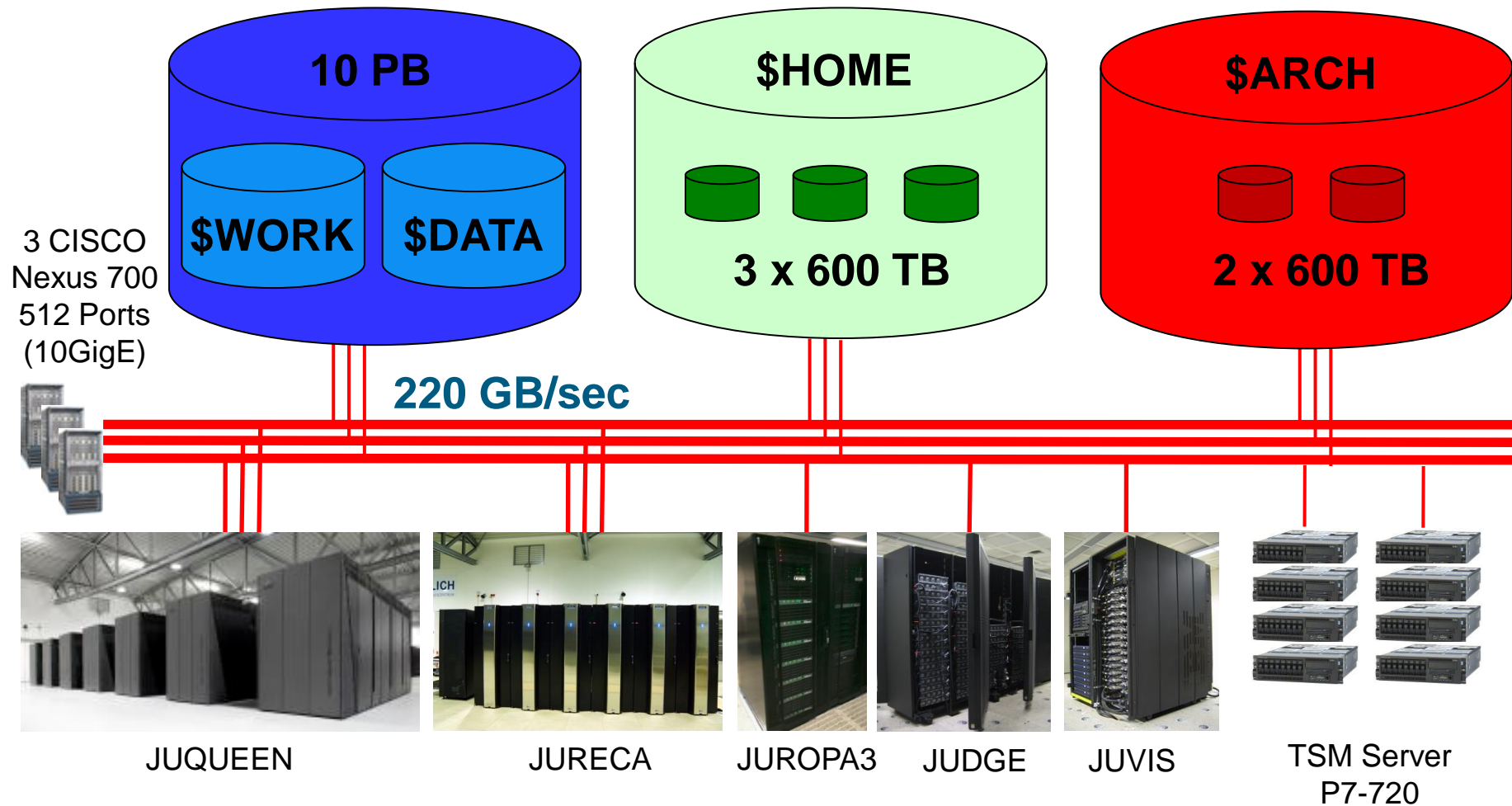
Lothar Wollschläger - Open Systems

# DATA CENTER

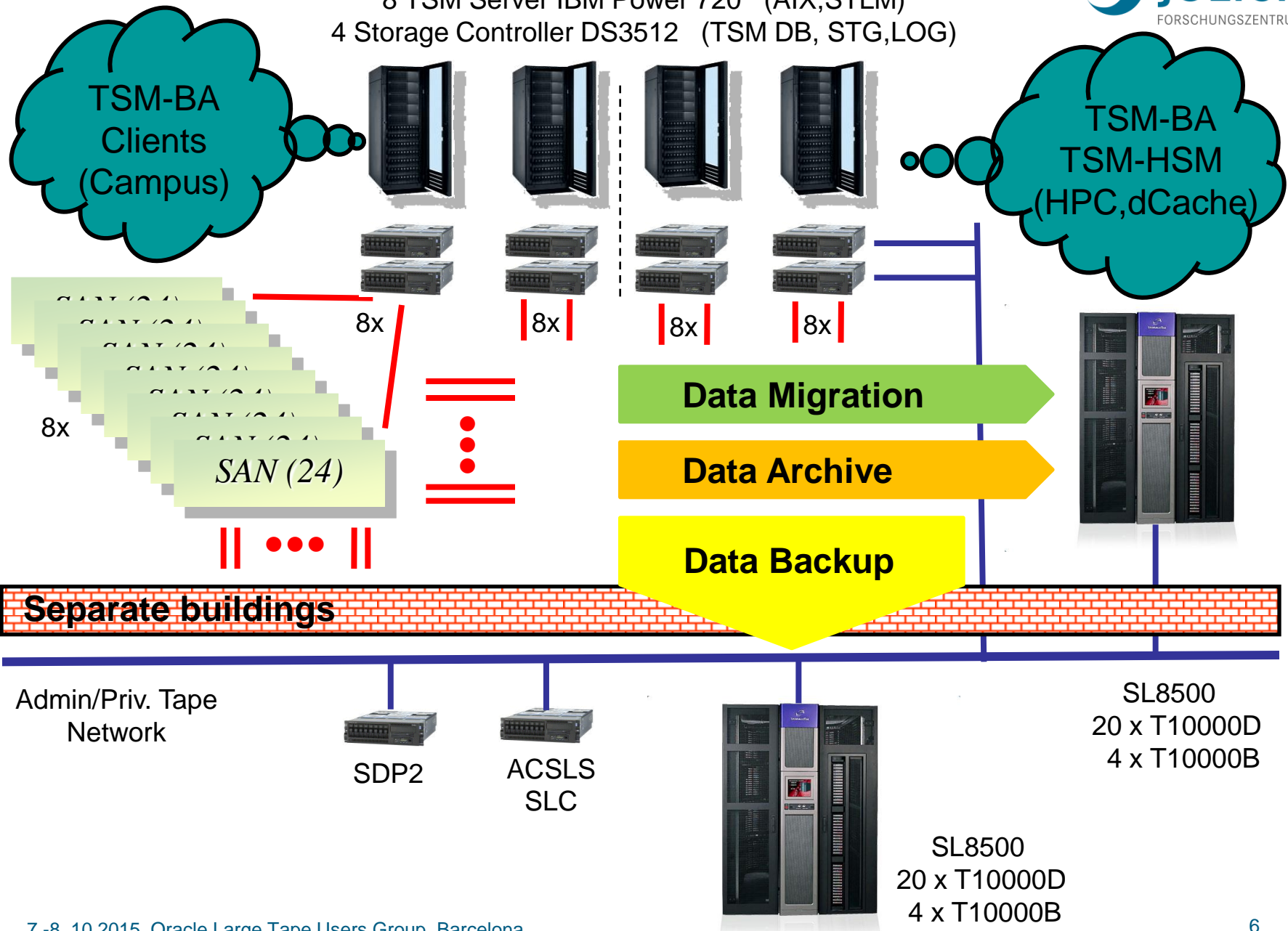
- Data Centers: **1**
- Open Systems Servers: **74**  
(GPFS-Fileserver: 66, TSM-Server: 8)
- CPU's (cores): **348**  
(GPFS-Fileserver: 284, TSM-Server: 64)
- Operating System Level: **RHEL 6.3/6.7 & AIX 6.1.7**
- Tape Management System: **ACSLs**  
(Operating System: Oracle Linux 6.3)
- Amount of Disk: **20 PB (gross), 15 PB (net)**
- Administrators for Disk: **5**
- Administrators for Tape: **3**

# JUST – Logical View

(Phase4f: Q3 2015)



8 TSM Server IBM Power 720 (AIX,STLM)  
4 Storage Controller DS3512 (TSM DB, STG,LOG)



# SOFTWARE

- Tape Management System: **ACSL 8.3.0**
- Tape Monitoring System: **SDP 2**
- SL8500 Monitoring System: **SLC 6.25**
  
- Shared Tape Library Manager: **TSM-Server 6.3.4.300**
  
- Data Migration Product: **TSM-HSM Client 7.1.2.0**
- Data Backup Product: **TSM Server 6.3.4.300**
- Data Archive Product: **TSM Server 6.3.4.300**

# ORACLE STORAGE TEK HARDWARE

- Tape libraries: **2 x SL8500**
- Actual capacity: **99 PB**
- Maximum capacity: **141 PB** (Type D)

|        | Capacity  | Cartridges   |                |              | Tape Drives |       |       |
|--------|-----------|--------------|----------------|--------------|-------------|-------|-------|
|        | PB        | Total        | T2<br>(8.5 TB) | T1<br>(1 TB) | Total       | T10KD | T10KB |
| SL8500 | 44        | 6600         | 5000           | 1600         | 24          | 20    | 4     |
| SL8500 | 55        | 10000        | 6000           | 4000         | 24          | 20    | 4     |
| Total  | <b>99</b> | <b>16600</b> | 11000          | 5600         | <b>48</b>   | 40    | 8     |

# PROJECTS SOLUTIONS COMMENTS (1)

- Projects with big scientific data
  - Human Brain Project
  - AMS Experiment @ ISS
  - LOFAR / SKA Telescope
- Capacity planning
  - 2014: **2.4 PB/Q**  
( 400 TB/mon \* **2 copies** \* 3 month → 300 tapes/Q à 8 TB)
  - 2013: **2.7 PB/Q**  
( 300 TB/mon \* 3 copies \* 3 month → 540 tapes/Q à 5 TB)
  - 2011/2012: **2.25 PB/Q**  
( 250 TB/mon \* 3 copies \* 3 month → 450 tapes/Q à 5 TB)
  - 2010: **1 PB/Q**  
( 100 TB/mon \* 3 copies \* 3 month → 1000 tapes/Q à 1 TB)



# PROJECTS SOLUTIONS COMMENTS (2)

- March 2011: Signed Contract for Library Upgrade
  - Period: 2011-2016
  - Stepping up from 16 PB to 80 PB
  - Replace tape drives and cartridges by new technology
- 2013 & 2014:
  - Need to increase tape capacity
  - Replace additional 1000 cartridges

# PROJECTS SOLUTIONS COMMENTS (3)

| Year     | Library upgrade action                    | Capacity PB           |                       |   |
|----------|---|-----------------------|-----------------------|---|
|          |   | Contract <sup>1</sup> | Realized <sup>2</sup> |   |
| 2011     | add 16 x T10KC drives, replace 3000 tapes | 28.6                  | 28.6                  | ✓ |
| 2012     | replace 2000 tapes                        | 36.6                  | 36.6                  | ✓ |
| 2013     | replace 2000 tapes                        | 44.6                  | 44.6                  | ✓ |
|          | additional: replace 1000 tapes            |                       | 48.6                  | ✓ |
| 2014     | replace 2 x T10KA by T10KD                |                       |                       |   |
|          | add/replace T10KC by 32 x T10KD           | 65.6                  | 76.6                  | ✓ |
|          | replace 1000 tapes                        | 72.6                  | 84.1                  | ✓ |
|          | additional: replace 1000 tapes            |                       | 91.6                  | ✓ |
| 2015     | replace 1000 tapes                        | 79.6                  | 99.1                  | ✓ |
| 2016     | replace 1000 tapes                        | 86.6                  | 106.6                 |   |
| Optional | replace 4600 tapes                        | 132.8                 | 141.1                 |   |

<sup>1</sup> Assuming 8 TB with T10KD, <sup>2</sup> Using 8.5 TB with MaxCap

# PROJECTS SOLUTIONS COMMENTS (4)

## What do we want from Oracle

- Need information about further product development
- Need roadmap for 5 years and later
- Need early discussions for strategic planning

## What do we want from LTUG

- Share knowledge with similar users
- Learn from other installations
- Get information about future product development
- Get roadmap information for about 5 years



# Thanks

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